VNG

Comments by VNG.co LLC on
Reconsideration of the Final Determination of the Mid-Term
Evaluation of Greenhouse Gas Emissions Standards
For Model Year 2022–2025 Light-Duty Vehicles

Docket ID: EPA–HQ–OAR–2015–0827

VNG.co LLC is a developer of compressed natural gas (CNG) fuel dispensing infrastructure for light- and medium-duty natural gas vehicles (NGVs). We welcome this opportunity to comment on the Midterm Evaluation (MTE) of light-duty vehicle greenhouse gas standards established for model years 2022-2025 and provide the agencies[1] with much-needed updated information on NGVs and their ability to contribute to the goals of the regulations.

Indeed, NGVs are perhaps the largest and most consequential knowledge gap in the agencies' work on these regulations to date. The only substantive discussion of NGVs in the 1,217 page Technical Assessment Review (TAR) issued by EPA, NHTSA and CARB was one short paragraph noting the growth in CNG fueling infrastructure,[2] and NGVs were not included in the TAR's models for automaker compliance.[3] This is inexplicable considering that U.S. OEMs (the "Big Three") have each produced pickups that operate on compressed natural gas (CNG) in recent years, as well as the fact that there are 22 million NGVs on the road globally - including many produced by OEMs that also serve the U.S. market.

However, this decision to exclude NGVs from serious analysis becomes even more confounding when one considers the radical changes that have occurred in the emissions profile of this technology since the original rulemaking. Renewable natural gas (RNG) can reduce lifecycle greenhouse emissions by 85% or more compared to gasoline, and this ultra-low carbon biofuel now accounts for over 35% of NGV fueling nationally and over 60% of NGV fueling in California. Furthermore, engine manufacturers are beginning to explore the potential of advanced engine designs to take advantage of CNG's high-octane, inherently low-emission properties - another major opportunity to meet the agencies' goals that has been completely unexplored to date.

The virtual exclusion of NGVs from the analysis and discussion has led to the perception of regulators having a false choice between siding with automakers and consumers on one side and environmentalists on the other. Automakers assert that they cannot stop consumers from buying the larger, less fuel-efficient vehicles they want (and in many cases need), and that meeting the current emissions targets for 2025 would impose major costs and risks on their business. Meanwhile, environmentalists insist that we need to transition our entire vehicle fleet to electric vehicles (including hydrogen fuel cell vehicles) as soon as possible, despite the fact

[1] While these Comments are being submitted in the EPA's docket, it is VNG's expectation that they will be also be considered by the National Highway Traffic Safety Administration (NHTSA) and the California Air Resources Board (CARB), collectively "the agencies."
[2] *Draft Technical Assessment Report: Midterm Evaluation of Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards for Model Years 2022-2025*, ENVIRONMENTAL PROTECTION AGENCY (July 2016), at 9-41, https://nepis.epa.gov/Exe/ZyPDF.cgi/P100OXEO.PDF?Dockey=P100OXEO.PDF (hereinafter "Draft TAR").
[3] *Id.* at 5-502.

VNG

that they are not projected to have more than 1-2% market share through at least 2025 – and are especially unlikely to be a practical choice for SUVs and pickups due to their weight and utility requirements.

NGVs are the missing piece of the puzzle. From an automaker's perspective, they offer a proven pathway to dramatically reducing emissions from their large-footprint vehicles, with similar costs and much greater benefits than lightweighting for pickup trucks. For environmentalists, the use of RNG offers similar or even superior emissions benefits to EVs, while also immediately addressing the segments of the auto market (e.g. light trucks) that are unlikely to have an electric alternative for the foreseeable future.

Reforming the light-duty emission regulations to make NGVs a practical compliance path for automakers thus offers the agencies a way to preserve the stringency of existing targets while simultaneously making it easier for automakers to meet them cost-effectively. Equally important, individual Americans will benefit from the use of a cleaner transportation fuel with lower and more stable pricing, compared to gasoline, all while purchasing the vehicles they want and need at reasonable costs. That's a win-win-win.

The following comments detail the reasons for providing robust regulatory support for NGVs on par with previous regulatory support for EVs, organized into the following sections.

- **The Need for Light Truck Alternatives in a Changing Market Context:** Consumer demand is shifting towards large vehicles with relatively low fuel economy. NGVs are ideally suited to provide a low-emission, non-petroleum alternative for the light truck segment, which is unlikely to be served by electric vehicle (EV) alternatives for the foreseeable future.

- **Renewable Natural Gas - A "Waste-to-Wheels" Emissions Game-Changer:** RNG is a game-changer that puts NGVs on par with an EV powered with wind or solar power - and it accounts for a much higher percentage of NGV fuel use than renewable electricity in the overall electricity mix. The rules must account for this dramatic shift and provide incentives for NGVs similar to those provided for EVs.

- **Potential for Rapid Cost Reductions, Consumer Savings with NGVs:** Unlike EVs, NGVs do not depend on inherently-expensive components like batteries, giving them much greater potential for rapid cost reductions with production at scale. This potential has already been demonstrated by European OEMs and gives NGVs much greater potential for mass-market adoption than the agencies have recognized to date.

- **Importance of Dual-Fuel NGVs:** Dual-fuel (commonly referred to as "bi-fuel") vehicles will play an important role in the market development of NGVs during early years of infrastructure buildout. The agencies took steps towards providing important support for bi-fuel NGVs in the original rulemaking, yet also placed unfair restrictions on this support that were not placed on similarly-important plug-in hybrid electric vehicles.

VNG

- **Advanced NGV Technologies Promise Best Emissions Path for Internal Combustion Engines (ICEs):** The development of new engine technologies optimized for CNG's inherently high-octane, clean-burning qualities gives NGVs unsurpassed potential for environmental performance on a mass-market-ready ICE platform.

- **"Bridge to Hydrogen" Needed More Than Ever:** The agencies have previously recognized the ability of NGVs to provide a "bridge" to hydrogen-fueled vehicles thanks to numerous technology synergies on the vehicle as well as the fueling side. The opportunities for such synergies have expanded in recent years, and are as urgently-needed as ever due to the slow market uptake of hydrogen fuel cell vehicles.

- **Emissions Solution for Mid-Life Vehicles:** Sec. 202(a) of the Clean Air Act requires the agencies to regulate vehicle emissions throughout their useful life, but the current light-duty program only provides incentives for low-emission technologies deployed in *new* vehicles. As states like Oklahoma and Utah have shown, there is significant potential to reduce emissions and petroleum use from older vehicles with CNG retrofits, and these benefits should be recognized and encouraged in these regulations.

- **Addressing the Threat of Petroleum Dependence:** The CAFE program was originally created as a response to the oil crisis of 1973; yet, more than 40 years later, the program has done very little to reduce our near-total dependence on petroleum, and the agencies project that the 2017-2025 rules will not make a meaningful difference either. The current regulations ensure this in part by disadvantaging natural gas, perhaps our best hope for a long-term solution to this problem.

- **NGV Reform Needed Today for 2017-2021 Targets:** Because the current disparity between treatment of NGVs and EVs is so clearly arbitrary and contrary to real-world lifecycle GHG emissions, and because automakers need this compliance flexibility and regulatory certainty in order to confidently invest in NGV production, these changes should be made effective immediately – without waiting for the 2022-2025 period. EPA's review of the 2021 targets as part of this proceeding is an excellent opportunity to do so.

In addition to providing information on each of these topics for use in the rulemaking process, we will indicate the specific topics from EPA's Request for Comment that each section is relevant to, and we will conclude each section with a list of recommended changes to the regulations. By updating the regulations to incentivize the deployment of NGVs similar to the previous administration's focus on incentivizing EVs, the agencies will provide automakers with a greater range of compliance pathways that will help achieve the goals of the regulations sooner and more cost-effectively, to the collective benefit of consumers, the environment and industry.

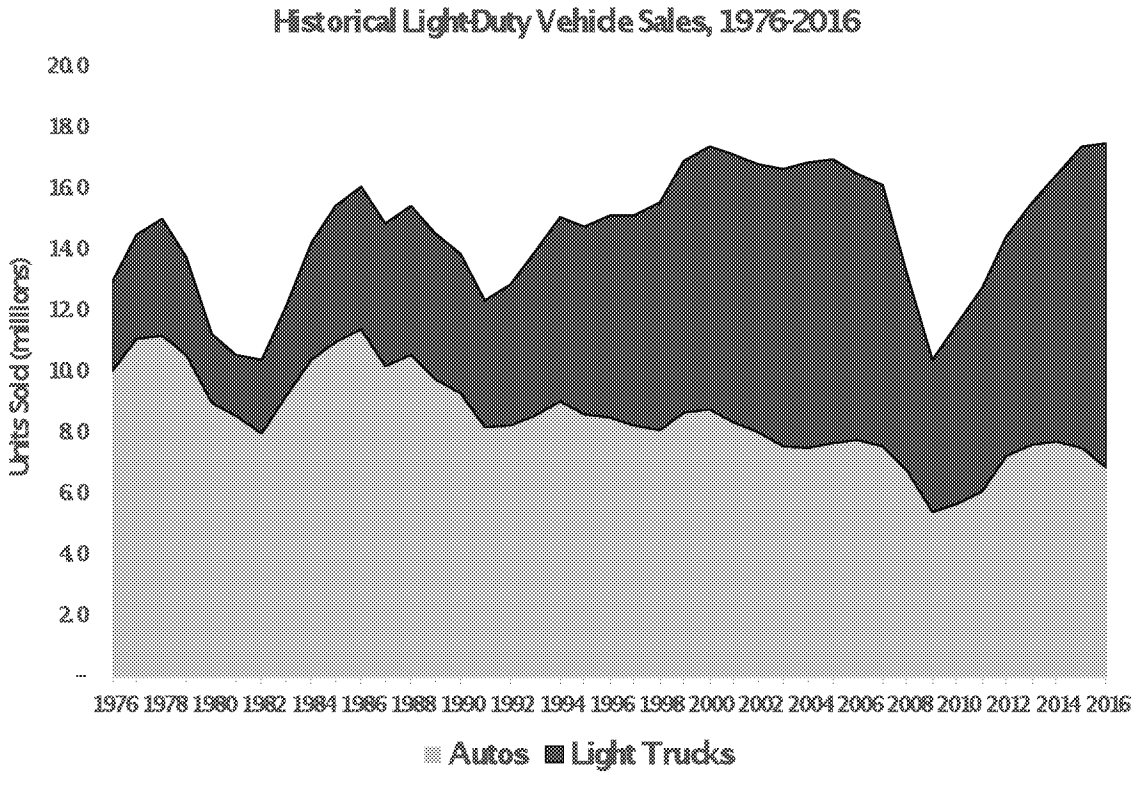
VNG

The Need for Light Truck Alternatives in a Changing Market Context

Issues Addressed:

- *The impact of the standards on the automobile industry*
- *The feasibility and practicability of the standards*

As the agencies acknowledged in the 2016 draft Technical Assessment Report (TAR), low gasoline prices have encouraged U.S. consumers to gravitate towards the purchase of larger and less fuel-efficient vehicles. After the Great Recession of 2008 decimated all classes of vehicle sales as well as oil prices, light truck sales have rebounded much more strongly than passenger vehicles and are approaching all-time highs and a market share of over 60%.[4] As the experience of the 1980s-2000s demonstrated, this shift in the market towards light trucks is likely to be sustained if gasoline prices stay low for the long term, as many observers have speculated - including oil majors like Shell, whose CEO recently said that oil prices may be "lower forever."[5]



Source: Bureau of Economic Analysis, 2017[6]

[4] *Auto and Truck Seasonal Adjustment*, BUREAU OF ECONOMIC ANALYSIS (August 2, 2017), https://www.bea.gov/national/xls/gap_hist.xlsx

[5] Sarah Kent, *Shell Prepares for 'Lower Forever' Oil Prices*, WALL ST. J. (July 27, 2017), https://www.wsj.com/articles/royal-dutch-shells-second-quarter-earnings-rise-sharply-1501137915

[6] *Auto and Truck Seasonal Adjustment*, BUREAU OF ECONOMIC ANALYSIS (August 2, 2017), https://www.bea.gov/national/xls/gap_hist.xlsx

VNG

Even if gasoline prices rise again, these large light duty vehicles will always account for a sizable part of the market due to their unique ability to meet specific consumer and business needs. While the footprint-based structure of the rules ensures that automakers will have to increase the fuel economy of all vehicles in order to achieve compliance, the TAR projected that this trend will nonetheless reduce the original projected impacts of the rules on petroleum dependence and greenhouse gas emissions.

The size of light trucks limits the availability of cost-effective solutions to increasing fuel economy and reducing emissions – particularly for full-size pickups, which have added performance requirements. For example, the TAR estimated that the total cost of a 20% mass reduction for towing-capable pickups, which would improve fuel economy and emissions by only 10%, would be roughly $3,000. It is also particularly challenging to electrify light trucks and pickups due to the added cost and weight of the battery packs needed to move these larger vehicles, particularly those built for carrying or towing heavy loads. Indeed, there are very few electric light trucks on the market today and no pickups, and the TAR does not even consider the possibility of electric towing-capable vehicles within the 2025 timeframe.[7]

Pickup trucks are the best-selling vehicles in America, as well as the most important source of profits for the "Big Three" U.S. automakers. Thus, a cost-effective solution to their emissions and petroleum dependence is absolutely essential to ensuring that these companies, their hundreds of thousands of employees, and the millions of consumers and businesses that rely on pickup trucks are not unnecessarily harmed by the agencies' regulations.

Fortunately, and in contrast to electrification, compressed natural gas (CNG) is ideally suited to be a low-emission, non-petroleum alternative fuel for light trucks and pickups especially. Larger vehicle envelopes provide ample room for CNG storage tanks, and since natural gas offers far greater energy density than batteries, it is much better-suited for moving heavy vehicles. These characteristics are why natural gas has long been the clean fuel of choice for heavy-duty vehicles like transit buses and refuse trucks, and the same logic holds true for the heavier side of the light-duty vehicle spectrum.

Indeed, automakers have demonstrated that NGVs are already a viable commercial technology. All three U.S. automakers have offered either CNG-equipped or CNG-ready versions of their flagship full-size pickups, including GM's Chevy Silverado,[8] FCA's Dodge Ram,[9] and Ford's F-

[7] Draft TAR, supra note 2, at 4-40.
[8] Brandon Turkus, *2015 Chevy Silverado HD gets CNG option*, AUTOBLOG (Feb. 6, 2014), http://www.autoblog.com/2014/02/06/2015-chevrolet-silverado-hd-cng-official/.
[9] Richard Truett, *Ram will expand lineup of CNG-powered trucks*, AUTOMOTIVE NEWS (Mar. 4, 2015), http://www.autonews.com/article/20150304/OEM05/150309913/ram-will-expand-lineup-of-cng-powered-trucks.

VNG

150. In fact, in addition to being the best-selling vehicle of any model, the 2016 Ford F-150 was named Green Car Journal's "Green Car of the Year" in part due to the availability of a CNG prep package as an option.[10]

Thus, the rules should encourage automakers to transition these vehicle segments to natural gas in two ways. First, they should be provided strong incentives to do so, including special incentives for pickup trucks similar to the incentive previously created for hybrid-electric pickups. Second, natural gas should be factored into setting targets for what can be reasonably achieved for light trucks and pickups, since this is a mature, proven, commercially-available technology that automakers have already deployed in recent years.

Summary and Recommendations

Because light trucks and pickups especially are a critical market segment for consumers, businesses and automakers, and because neither electrification nor lightweighting are practical alternatives for these heavier vehicles, EPA should provide a clear regulatory pathway for automakers to transition these segments to natural gas.

- Provide emissions credits for all NGVs that reflect the emissions benefits of renewable natural gas (RNG), as discussed in the following section.

- Offer a "Natural Gas Pickup" incentive similar to current hybrid-electric and "performance-based" pickup credits; however, for the natural gas pickup credit, minimum deployment thresholds should be eliminated to reflect the greater market challenges faced by NGVs - since, unlike hybrid-electrics, they use an alternative fuel. Expecting an automaker to immediately transition at least 10% of their critical pickup fleet to an alternative fuel is simply not realistic, and renders the current "performance-based" credit useless despite the fact that natural gas can meet the credit's performance threshold of 20% emission reductions.

    - This goal could be accomplished by inserting a new section (c) under 40 C.F.R. § 86.1870–12, *CO_2 credits for qualifying full-size pickup trucks*, titled "Credits for implementation of natural gas technology." The structure of these credits would be similar to those for sections (a) and (b), but with reduced or eliminated requirements for the "required minimum percent of full size pickup trucks."

[10] *Fuel Efficiency, Alternative Fuels and Sustainability Earn Ford F-150 2016 Green Truck of the Year Award*, FORD MOTOR CO. (Nov. 19, 2015), https://media.ford.com/content/fordmedia/fna/us/en/news/2015/11/19/ford-f-150-earns-2016-green-truck-of-the-year-award.html.

VNG

- Incorporate the use of natural gas when setting targets for practical, achievable emissions improvements for light trucks and full-size pickups.

Renewable Natural Gas - A "Waste-to-Wheels" Emissions Game-Changer

Issues Addressed:

- *The availability and effectiveness of technology, and the appropriate lead time for introduction of technology*
- *Any relevant information in light of newly available information.*
- *The impact of the greenhouse gas emission standards on the Corporate Average Fuel Economy standards and a national harmonized program*

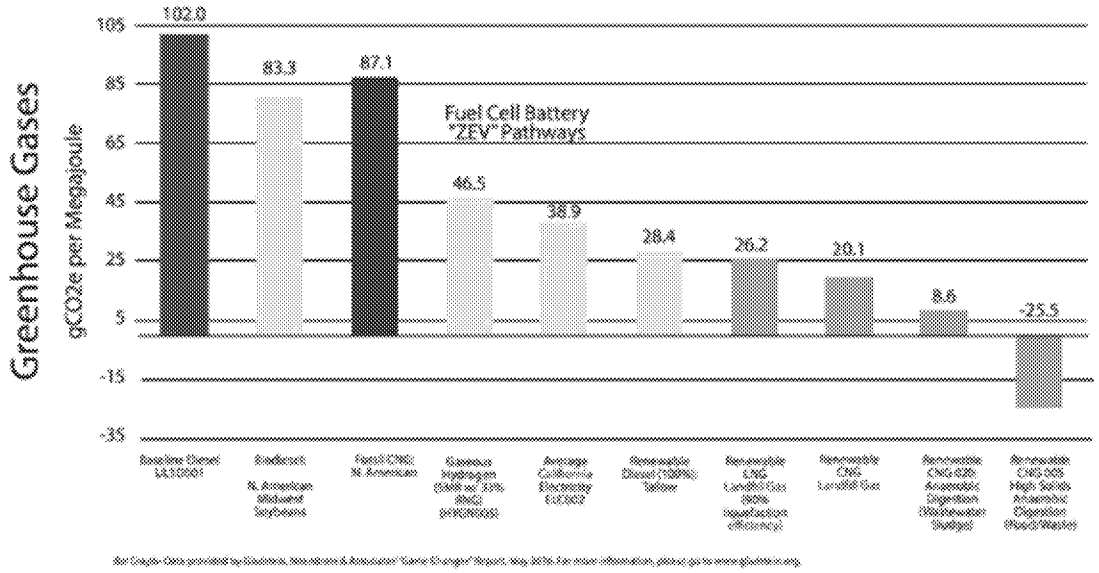
Since the original rulemaking, there has been a dramatic transformation of the lifecycle emissions profile of NGVs due to the rapid adoption of renewable natural gas (RNG) in the transportation sector. Indeed, this is likely the biggest change in the lifecycle emissions of any fuel or vehicle type since the 2011 rulemaking – yet it was completely absent in the draft TAR for reasons that are not clear.

RNG, also known as biogas or biomethane, captures methane produced from a variety of sources including landfills, dairy and livestock operations, and wastewater treatment plants. Once impurities are removed, this methane can be used as a perfect substitute for fossil natural gas, including distribution in the existing natural gas pipeline system and use in NGVs.

Since methane is a powerful greenhouse gas, the use of RNG can achieve massive emission reductions on a CO2-equivalent basis when used as a transportation fuel. While lifecycle emissions can vary significantly depending on the pathway for RNG production, according to the most recent values for the California Low Carbon Fuel Standard (LCFS) it can yield emission cuts of between 70% and *130%*[11] - in other words, NGVs powered by RNG can be carbon-negative, potentially yielding even greater emissions benefits than an electric vehicle powered entirely by solar or wind energy.

[11] Staff Report, CALIFORNIA AIR RESOURCES BOARD, Proposed Re-Adoption of the California Low Carbon Fuel Standard. Dec. 2014. https://www.arb.ca.gov/regact/2015/lcfs2015/lcfs15isor.pdf.

VNG



Source: Gladstein, Neandross & Associates[12]

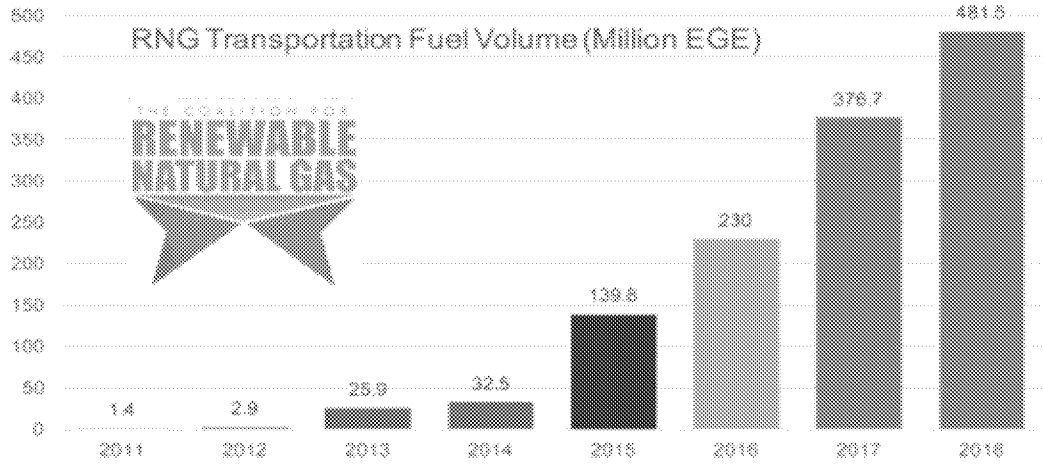
In the original 2017-2025 rulemaking, EPA recognized the potential for RNG to deliver "game-changing" lifecycle GHG emissions for NGVs, but stated that the agency "believe[d] that biomethane will remain a small part of the overall natural gas market for the foreseeable future."[13] This belief is, simply put, outdated. Today, RNG fueling is increasingly the norm for NGVs thanks to the federal Renewable Fuel Standard (RFS) and the California Low Carbon Fuel Standard (LCFS). While these programs were in their infancy during the original rulemaking in 2011, they have since emerged as powerful economic drivers for RNG use in transportation, thanks to the reclassification of RNG as a cellulosic biofuel by EPA[14] as well as CARB's ranking of it as the lowest GHG fuel on the market. [15] Today, the value of these RFS and LCFS credits has made RNG commercially competitive with fossil natural gas.[16]

This economic driver has led to the very rapid increase in the production and sale of RNG fuel to the transportation sector – particularly in California, where fuel retailers can benefit from sales of both LCFS and RFS credits and where there are the largest number of NGVs and natural gas fueling stations. According to the RNG Coalition, over 60% of NGV fueling in California and 35%

[12] *Game-Changer: Next Generation Heavy Duty Natural Gas Engines Fueled By Renewable Natural Gas*, GLADSTEIN, NEANDROSS AND ASSOCIATES (May 2016), http://ngvgamechanger.com/pdfs/GameChanger_FullReport.pdf
[13] 2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards, 77 Fed. Reg. 62815 (Oct. 15, 2012) (hereinafter "*2012 Light Duty GHG Standards*").
[14] "Renewable Fuel Pathways II Final Rule to Identify Additional Fuel Pathways under Renewable Fuel Standard Program Documents." ENVIRONMENTAL PROTECTION AGENCY. July 18, 2014. https://www.epa.gov/renewable-fuel-standard-program/renewable-fuel-pathways-ii-final-rule-identify-additional-fuel-0
[15] Staff Report, CALIFORNIA AIR RESOURCES BOARD, Proposed Re-Adoption of the California Low Carbon Fuel Standard (Dec. 2014), https://www.arb.ca.gov/regact/2015/lcfs2015/lcfs15isor.pdf
[16] *The Feasibility of Renewable Natural Gas as a Large-Scale, Low Carbon Substitute*, UC DAVIS INSTITUTE OF TRANSPORTATION STUDIES, June 2016. https://www.arb.ca.gov/research/apr/past/13-307.pdf

VNG

nationally comes from RNG.[17] In terms of absolute volumes, RNG fuel use in transportation increased fivefold between 2013 and 2015, and the Coalition projects it will more than quadruple between 2015 and 2018.



Source: RNG Coalition, Fleets & Fuels Magazine[18]

With this trajectory of RNG growth, the emissions benefits of NGVs today are already at least as powerful as EVs and likely even greater. Thus, ignoring the growth of RNG is not only outdated, but it renders the regulations ineffective in their stated goal of reducing GHG emissions. It also inhibits job creation not only in the NGV industry but the RNG industry as well, which has the potential to create jobs at farms and municipalities across the country through the capture and sale of locally-produced renewable fuel.

In addition to missing an opportunity to achieve the goals of the regulations, the failure to recognize the emissions benefits of RNG has also resulted in EPA effectively negating Congressional incentives for NGVs under the CAFE program. According to Sec. 6 of the Alternative Motor Fuels Act (AMFA)[19] codified as 49 U.S. Code § 32905, the fuel economy of NGVs and EVs alike is to be calculated using the Petroleum Equivalency Factor (PEF) that treats every gallon-equivalent of compressed natural gas or equivalent electrical energy as 0.15 gallons of gasoline. The goal of this technology-neutral statutory calculation was to provide automakers with a strong incentive to manufacture ***both*** types of alternative fuel vehicles to achieve the goal of American energy independence. By encouraging the production of vehicles that reduce the use of higher-carbon petroleum fuels, the statute also reduces emissions.

While the statute requires that NGVs and EVs be treated the same in terms of measuring fuel economy, there is no equivalent law governing measurement of GHGs. EPA chose to follow

[17] Patrick Couch, *RNG in California: More Than You Think*, FLEETS AND FUELS (Apr. 20, 2016), http://www.fleetsandfuels.com/fuels/cng/2016/04/rng-in-california-more-than-you-think/.
[18] *Id.*
[19] Alternative Motor Fuels Act of 1988, Public Law 100-494, 102 Stat. 2441.

VNG

Congressional CAFE incentives through model year (MY) 2015[20] but thereafter to give NGVs credit for only their tailpipe emissions reductions of approximately 20% compared to gasoline instead of the "0.15 divisor,"[21] while temporarily treating EVs as having *zero* emissions.[22] In its original 2017-2025 rulemaking, EPA acknowledged that this calculation for EVs failed to account for the upstream emissions produced by EVs from power generation but claimed that the long-term potential of EVs to produce "game-changing" emissions when charged with renewable electricity justified this unprecedented incentive.[23]

By contrast, in the same rulemaking EPA recognized the potential for RNG to deliver "game-changing" lifecycle GHG emissions for NGVs, but stated that the agency "believe[d] that biomethane will remain a small part of the overall natural gas market for the foreseeable future."[24] As discussed above, this expectation has been proven wrong for natural gas transportation. To be consistent with this new reality and the goals of the regulation, as well as with the goal of harmonizing EPA's regulations with the statutory CAFE program, the rules should give *both* fuels incentives that reflect their "game-changing" emissions potential: for NGVs, this means credits that are equivalent to 100% RNG fueling, in the same way that the 0 g/mi incentive for EVs is equivalent to the use of 100% renewable electricity.

It would be justifiable to calculate the emissions of a 100% RNG-fueled NGV as 85% below that of a gasoline vehicle - which would be in line with the average cited in the NPC's topic paper on the subject[25] as well as a return to the "0.15 divisor" in line with CAFE's PEF calculation. And, because the present bias towards EV incentives represents the most egregious inconsistency of EPA's regulations with the CAFE program, we believe it is also justifiable to make this change effective immediately, instead of waiting for 2022.

Summary and Recommendations

RNG has transformed the emissions of NGVs since the original rulemaking, accounting for 35% of NGV fueling nationally and delivering emission reductions of 70% to 130%. Because of this game-changing emissions potential, and because existing EPA incentives for alternative fuels are biased towards EVs and disruptive of Congressionally-mandated CAFE incentives for NGVs, the emission calculation for NGVs should be reformed effective immediately.

---

[20] Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards, 75 Fed. Reg. 25716 (May 7, 2010)
[21] *2012 Light Duty GHG Standards* at 62623, 62816.
[22] *Id.* at 62819.
[23] *Id. at* 62820.
[24] *Id.* at 62815.
[25] Report, NATIONAL PETROLEUM COUNCIL, *Advancing Technology for America's Transportation* (2012), http://www.npc.org/reports/trans.html.

VNG

- NGV emissions calculations should return to the "0.15" divisor used before 2016, with emissions calculated as 85% below a gasoline vehicle. This is both justified by the real-world emissions benefits of RNG and is consistent with the CAFE program.

    - We recommend reinstating language from the MY 2011-2016 regulations under 40 C.F.R. § 600.510–12, *Calculation of average fuel economy and average carbon-related exhaust emissions*: "For natural gas-fueled model types . . . the carbon-related exhaust emissions value calculated for that model type in accordance with paragraph (b)(2) of this section multiplied by 0.15 and rounded to the nearest gram per mile, except that manufacturers complying with the fleet averaging option for N_2O and CH_4 as allowed under § 86.1818 of this chapter must perform this calculation such that N_2O and CH_4 values are not multiplied by 0.15.[26]"

- This change should be effective retroactively to model year 2017, given the major impediment to NGV adoption posed by the current incentive structure as well as the uniquely egregious regulatory overreach it represents compared to the CAFE program.

- To mirror EV incentives, EPA could consider a similar volume-based transition after 2022 to a regime that considers the real-world use of RNG just as EV incentives will ultimately be calculated based on real-world lifecycle emissions; this would be relatively simple to do since EPA already tracks RNG use under the RFS program.

Potential For Rapid Cost Reductions, Consumer Savings with NGVs

Issues Addressed:
- *The cost on the producers or purchasers of new motor vehicles*
- *The feasibility and practicability of the standards*

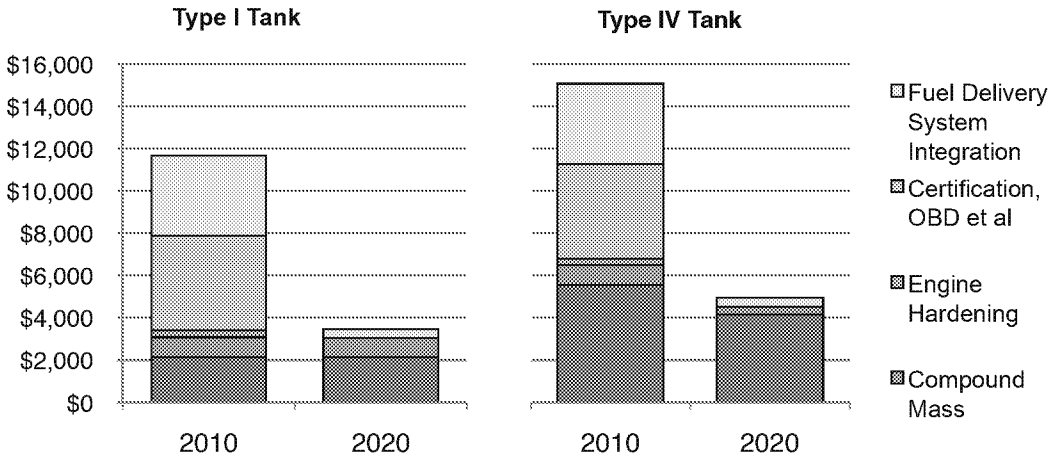
As part of a shift towards a serious analysis of NGVs in the MTE, the agencies must consider not only the current costs of NGVs but their potential for very rapid cost reductions with production at scale. Indeed, while the current incremental prices of CNG pickups are typically $10,000 or more (including upfitting costs), these high costs are primarily due to the need to spread significant up-front design and certification costs over a small number of vehicle sales.

The 2012 report "Advancing Technologies for America's Transportation Future" by the National Petroleum Council (NPC) estimates that about two thirds of the incremental cost of a NGV pickup comes from these areas, and that incremental costs could be reduced to $3,500 per vehicle by 2020 simply by moving to high-volume production (over 100,000 vehicles per year).[27]

[26] 40 C.F.R. § 600.510–12(j)(2)(iii)(A).
[27] Report, NATIONAL PETROLEUM COUNCIL, *Advancing Technology for America's Transportation* (2012), http://www.npc.org/reports/trans.html.

These projections are based in part on experiences in major NGV markets in Europe like Italy and Germany, where volume production has driven incremental costs down to $3,000 or less.[28]

Projected NGV Pickup Incremental Costs, National Petroleum Council



This compares very favorably to the current and projected incremental costs of electric and plug-in electric vehicles. Unlike NGVs, which use the same internal combustion engine platforms as gasoline vehicles and mostly only require the addition of a compressed gas tank made of steel or composites, EVs use batteries that require numerous expensive components and can only reduce costs relatively slowly. This is a critical difference for the agencies to incorporate into their planning, given much greater potential for near-term mass-market adoption of NGVs.

The mass-market potential of NGVs is due to the combination of (potentially) low incremental costs along with the lower and more stable price of natural gas compared to petroleum fuels, which allows the incremental cost to be recouped relatively quickly. According to modeling done in conjunction with the NPC study, this combination gave NGVs the potential to achieve a 17 percent light-duty vehicle market share by 2020 - more than twice the combined market share of electric and plug-in electric vehicles given their projected cost improvements.[29] While this 2012 forecast is clearly unrealistic from the perspective of 2017, the impressive potential for mass-market adoption of a cleaner fuel - and *much* cleaner when RNG is used instead of fossil natural gas - remains an opportunity that should be seriously considered in the agencies' analysis and target-setting.

Indeed, putting aside the comparison to EVs, the potential incremental costs for NGV pickups are comparable to the projected costs for 20% mass reduction via lightweighting cited earlier - $3,000 per pickup. However, as previously stated, lightweighting is forecasted to yield a fuel economy and emissions improvement of only 10%. NGV pickups at scale would have a similar

[28] Rohan Nath et al., *A Realistic View of CNG Vehicles in the US*, BCG PERSPECTIVES (June 16, 2014), https://www.bcgperspectives.com/content/articles/energy_environment_automotive_realistic_view_cng_vehicles_us/.
[29] *Id.*

incremental cost, yet deliver *twice* the emission reductions with fossil natural gas and many times that with RNG. NGV pickups also completely eliminate petroleum dependence, protecting this critical market segment (and all the consumers, businesses, and workers that depend on it) from oil price swings.

Thus, natural gas deserves to be included in the formulation of the targets for pickups and other light trucks just like other fuel efficiency technologies that have been proven to be cost-effective at scale. This would significantly increase the achievable fuel economy and emissions improvements for these segments within the timeframe of the rulemaking and thus provides a strong rationale for potentially maintaining the existing targets. [30]

Summary and Recommendations

Because NGVs have been proven to deliver rapid and deep cost reductions with high-volume production, the agencies should incorporate them as such into their analysis.

- Modeling used to set achievable emissions curves for pickups and light trucks should include natural gas as a proven technology at costs based on high-volume adoption, not their current incremental costs at low production volumes.

Importance of Dual-Fuel NGVs

Issues Addressed:
- *The impact of the standards on the automobile industry*
- *The feasibility and practicability of the standards*

Dual-fuel NGVs (referred to in the industry as "bi-fuel" NGVs) that operate primarily on CNG but can also operate on gasoline as a backup fuel are likely to play a critical role in winning market adoption of NGVs more broadly. The ability to fuel on gasoline as a backup fuel effectively eliminates consumers' "range anxiety" while CNG fueling infrastructure is not yet as widely available as gasoline, in the same way that dual-fuel electric vehicles (referred to in the industry as plug-in hybrid electric vehicles, or PHEVs) like GM's Chevy Volt have played an important role in expanding the early market for EVs.

The 2017-2025 rulemaking made a major stride towards recognizing the potential benefits of dual-fuel NGVs, which had previously only been assumed to fuel on CNG for 50% of the time. EPA recognized that drivers purchasing dual-fuel NGVs as well as PHEVs are likely to live in areas where fueling (or charging, respectively) infrastructure is reasonably available, and will also preferentially use these alternative fuels whenever possible given their lower cost

[30] Starting the NPC's eight-year projection in 2017 instead of 2012 would imply that an NGV market share of 17 percent could be achieved by 2025 with huge reductions of emissions and petroleum consumption.

VNG

compared to gasoline. Thus, the rules allowed automakers to calculate the fuel usage of both dual-fuel NGVs and PHEVs using a method called the "utility factor" which bases relative consumption of alternative fuels versus gasoline on the vehicle's range on the alternative fuel.[31]

Using this method, a dual-fuel NGV with 250 miles of CNG range – such as the 2015 Dodge Ram[32] – would be assumed to operate on CNG 97.1% of the time, making them nearly as beneficial as a dedicated NGV. PHEVs would receive a similar calculation, although their much shorter all-electric range makes the incentive relatively less beneficial. For example, in the original rulemaking EPA estimated that the Chevy Volt would receive a utility factor of 69% for an all-electric range of 50 miles. [33]

However, despite the fact that utility factors for dual-fuels are ostensibly to be calculated based on their range on alternative fuels, EPA has saddled dual-fuel NGVs with a unique and onerous additional requirement: they must have a CNG range at least double that of their gasoline range in order to qualify for the utility factor calculation, or else they default to an assumed baseline 50% CNG fuel use.[34] Not only that, to be eligible for the incentive, the dual-fuel NGVs must be designed to only use gasoline when the CNG tank is empty.

This requirement is inconsistent with the EPA's assumption that dual-fuel vehicles will fuel as often as possible on CNG for economic reasons, which would imply that their proportion of CNG use should be solely determined by their CNG range according to the utility factors – and not by their gasoline range. Adding further inconsistency, PHEVs face no such requirements, despite the fact of their much more limited all-electric range.

In addition to rendering incentives for dual-fuel NGVs less effective, this requirement adds marketing challenges and, significantly, unnecessary costs to automakers and consumers. To date, the configurations offered by automakers have focused on vehicles that maintain full range on gasoline in order to provide as long of a combined range as possible as well as flexibility; for instance, the dual-fuel GM Silverado has a combined CNG and gasoline range of 650 miles (with the majority coming from gasoline) and allows drivers to switch fuels by flipping a switch.[35]

Beyond unnecessarily restricting customer appeal, the CNG-to-gasoline driving range requirement would require automakers to reduce the size and capacity of the existing gasoline fueling systems in dual-fuel NGVs, which will impose additional costs on manufacturers that will

---

[31] *2012 Light Duty GHG Standards* at 62829.
[32] Richard Truett, *Ram will expand lineup of CNG-powered trucks*, AUTOMOTIVE NEWS (Mar. 4, 2015), http://www.autonews.com/article/20150304/OEM05/150309913/ram-will-expand-lineup-of-cng-powered-trucks.
[33] *2012 Light Duty GHG Standards* at 62828.
[34] *Id.* at 62829.
[35] Brandon Turkus, *2015 Chevy Silverado HD gets CNG option*, AUTOBLOG (Feb. 6, 2014), http://www.autoblog.com/2014/02/06/2015-chevrolet-silverado-hd-cng-official/.

have to be passed on to consumers. Today's dual-fuel pickup truck designs leave the existing gasoline fueling systems intact and simply add CNG storage capacity by placing the CNG tank in the bed of the pickup truck. Downsizing the gasoline fueling system would require additional design, manufacturing, and certification costs that would serve no purpose other than meeting an arbitrary and unnecessary regulatory requirement.

Of course, automakers could also pursue an alternative pathway and maintain the existing gasoline tank size and instead greatly increase CNG fueling capacity. However, this would require tripling or quadrupling the number of CNG tanks currently installed in vehicles like the dual-fuel Dodge Ram, which would add so much weight and take up so much space in the pickup bed that it would be completely unusable for the work fleets that depend on these vehicles. Once again, the current requirement forces automakers to make changes that would increase costs and reduce market acceptance in order to receive full regulatory benefits.

Allowing all NGVs to receive the full utility factor credit for CNG use would remove an unnecessary, ineffective, and arbitrary regulatory impediment to the development of this crucial market segment for stimulating growth in the wider NGV industry.

Summary and Recommendations

Because dual-fuel NGVs are critical for market development and consumer acceptance, and because the agencies should strive to be consistently technology-neutral in their incentives, the unique requirements for dual-fuel NGVs to receive credits based on utility factor calculations should be eliminated.

- Remove the utility factor requirements for a 2:1 ratio of CNG-to-gasoline range, as well as the requirement for dual-fuel NGVs to only use gasoline when the CNG tank is empty.
    - This goal could be achieved by deleting the requirements contained in 40 C.F.R. § 600.510–12, *Calculation of average fuel economy and average carbon-related exhaust emissions*, part (c)(2)(vii)(B) for fuel economy and (j)(2)(vii)(B) for emissions.

Advanced NGV Technologies Promise Best Emissions Path For ICEs

Issues Addressed:

- *The impact of the standards on advanced fuels technology, including but not limited to the potential for high-octane blends*
- *The impact of the standards on compliance with other air quality standards;*
- *The availability of realistic technological concepts for improving efficiency in automobiles that consumers demand, as well as any indirect impacts on emissions;*

VNG

Going beyond today's NGV technology, the agencies should consider the enormous untapped potential of natural gas to deliver even greater environmental and fuel economy benefits in the future. As the highest-octane, cleanest hydrocarbon fuel, natural gas has very favorable physical properties for unsurpassed performance from an internal combustion engine – if automakers are sufficiently incentivized to invest in developing this fuel to its full potential.

Natural gas has 130 octane, far beyond what gasoline – even ethanol-blended gasoline – can provide. In the "Advancing Technologies for America's Transportation Future" study, the NPC projected that this could yield fuel economy up to double that of conventional vehicles when combined with direct injection technologies that fully utilize the properties of CNG.[36] The leading CNG conversion company Westport Innovations is already investigating the potential for natural gas-fueled advanced powertrains that exploit these properties for pickup trucks, with a turbocharged direct injection platform that could reduce carbon emissions by at least 30%.[37]

The potential environmental benefits of CNG aren't limited to greenhouse gases. In 2015, Cummins Westport International (CWI) introduced a heavy-duty CNG engine that was the first engine of any kind to meet the California Air Resources Board (CARB) optional low-NOx emission standard of 0.02 g/bhp-hr NOx – 90% below the 2010 EPA certification level. [38] Owing to the inherently cleaner chemistry of natural gas compared to petroleum-based fuels, similar improvements in performance for NOx emissions could likely be achieved for light-duty vehicles given sufficient automaker interest and investment. While NOx emissions are much lower for gasoline-fueled vehicles compared to diesel vehicles, they are still significant, making this a major untapped opportunity to address smog-forming emissions on our roads.

Agency staff should study the potential of advanced technology to further improve the emissions profile of NGVs, in the same in-depth manner that it has investigated the current and future state of EV and FCV technology. Furthermore, it should incorporate this potential in its assessment of the "game-changing" potential of NGVs as justification for strong incentives.

Summary and Recommendations

---

[36] Report, NATIONAL PETROLEUM COUNCIL, *Advancing Technology for America's Transportation* (2012), http://www.npc.org/reports/trans.html.

[37] *Methane: The Performance Fuel*, WESTPORT INNOVATIONS (October 2015) https://cleancities.energy.gov/files/u/news_events/document/document_url/128/Brad_Douville___Westport_NGVTF_.pdf

[38] *Game-Changer: Next Generation Heavy Duty Natural Gas Engines Fueled By Renewable Natural Gas*, GLADSTEIN, NEANDROSS AND ASSOCIATES (May 2016), http://ngvgamechanger.com/pdfs/GameChanger_FullReport.pdf

VNG

Because of the high-octane, low-emission properties of natural gas, the agencies should fully study the ability of advanced NGV technologies to further reduce CO2 and smog-forming pollutants and incorporate the results into regulatory incentives and long-term target setting.

- The ability of NGVs to deliver unsurpassed fuel economy for an ICE vehicle should be used as a further rationale for returning to the use of the "0.15 divisor" for calculating NGV emissions, as discussed in the above section on RNG.

"Bridge to Hydrogen" Needed More Than Ever

Issues Addressed:
- *The availability and effectiveness of technology, and the appropriate lead time for introduction of technology*
- *Any relevant information in light of newly available information.*

In awarding advanced technology multiplier incentives to NGVs, the original light-duty vehicle rulemaking in 2012 recognized that there are numerous technical synergies between the development and commercialization of NGVs and hydrogen fuel cell electric vehicles (FCVs) owing to the physical similarities between methane and hydrogen. The agencies wrote that "CNG investments have the potential to facilitate the introduction of hydrogen FCVs in several respects," including innovations in advanced storage materials and tube trailer designs, improved designs for compressors and fuel dispensers, and on-site production of hydrogen from natural gas feedstock. VNG helped to lay out this rationale in a white paper, "NGVs: An Essential Bridge to Hydrogen," commissioned from the consultancy Energy Futures.[39]

Since 2012, the FCV industry has taken its first steps towards commercialization, with Toyota, Honda, and Hyundai each offering models for the U.S. market. The TAR was cautiously optimistic about the uptake of these technologies, with an estimated 125,000 FCVs deployed in California by 2025 thanks to the Zero Emissions Vehicle (ZEV) mandate. However, this does not mean they are fully commercial technologies; indeed, it means that the need for NGV synergies to accelerate the development of this market has been elevated from the realm of the theoretical to the practical. The need is particularly urgent in the area of hydrogen fueling infrastructure, as the TAR estimated that hydrogen fuel demand could begin to outpace infrastructure availability as early as 2019 and as late as 2026.

As noted in the original rulemaking, some of the strongest synergies between these fuels are in the area of infrastructure development. Both CNG and hydrogen fueling stations require the same types of equipment, including compressors, high-pressure storage tanks, and gaseous fuel dispensers. Shared standards, equipment designs, production and operational economies

[39] *Natural Gas: An Essential Bridge to Hydrogen Fuel Cell Vehicles,* ENERGY FUTURES (2011) http://vng.co/wp-content/uploads/2012/05/Natural-Gas-An-Essential-Bridge-To-Hydrogen-Fuel-Cell-Vehicles.pdf

VNG

of scale, and technology innovations in this area could simultaneously drive down costs for both fuels. The September 2014 report "Transitioning the Transportation Sector: Exploring the Intersection of Hydrogen Fuel Cell and Natural Gas Vehicles" by the Sandia National Laboratory[40] goes further, with a concept design for a combined hydrogen and natural gas fueling station that "could improve operational expenditures and also take advantage of common supply chains."

The TAR also noted that "implementation of renewable hydrogen sourcing has posed a financial challenge" for stations developed to date, despite a minimum renewable content of 33% to receive grants from the California Energy Commission and greater incentives for 100% renewable hydrogen stations. RNG is an ideal feedstock for renewable hydrogen production via steam methane reforming (SMR) technology, but the market for FCVs is currently too small to drive widespread development of these resources. As discussed earlier in these comments, increasing the deployment of RNG-fueled NGVs is key to building the market and growing demand for this ultra-low GHG fuel in the near term, ensuring sufficient supplies of RNG for renewable hydrogen production in the longer term.

Finally, these synergies may also yield benefits in the opposite direction, with advances in hydrogen improving the emissions profile of NGVs. The TAR recognizes the potential benefits of power-to-gas applications, in which large-scale wind and solar generation can be used to create hydrogen for blending into natural gas pipelines. While it is discussed in the context of reducing the lifecycle emissions of hydrogen production, this is also clearly relevant to reducing the lifecycle emissions of CNG. The 2013 report "Blending Hydrogen into Natural Gas Pipeline Networks" by the National Renewable Energy Laboratory[41] estimates that natural gas pipelines could accommodate blends of 5-20% hydrogen content with no technical changes by end users (e.g. NGVs), which would not only reduce the overall carbon content of natural gas but also reduce methane leakage from the pipeline system (since hydrogen, as a lighter molecule, would escape from leaks first and 'crowd out' methane).

The NREL report notes that "conceivably, a credit trading system could apply to natural gas with a specified blend content of renewable hydrogen, paralleling the renewable energy credit system used in the electricity sector." In fact, such programs already exist in the transportation sector: the LCFS and RFS programs both allow for the addition of new low-carbon and renewable fuel pathways, and renewable hydrogen-enriched natural gas sold as fuel for NGVs could readily fit within these schema. As with RNG, NGVs can play a crucial role in building this

[40] *Transitioning the Transportation Sector: Exploring the Intersection of Hydrogen Fuel Cell and Natural Gas Vehicles*, SANDIA NATIONAL LABORATORY (2014), https://energy.gov/sites/prod/files/2015/02/f19/2015-01_H2NG-Report-FINAL.pdf

[41] *Blending Hydrogen into Natural Gas Pipeline Networks: A Review of Key Issues*, NATIONAL RENEWABLE ENERGY LABORATORY (2013), http://www1.eere.energy.gov/hydrogenandfuelcells/pdfs/blending_h2_nat_gas_pipeline.pdf

market in the near term to ensure the availability of renewable, low-emission feedstocks for hydrogen fuel production in the long term.

In all these ways, NGVs could provide much-needed boosts to the development of the FCV industry. On the commercialization side, NGVs will help stimulate adoption of FCVs through lower costs and expanded infrastructure availability, and on the environmental side the expansion of availability of renewable gas feedstocks will maximize the climate benefits of these vehicles. Indeed, NGVs and FCVs should be considered part of the same gaseous fuel pathway and recognized as such in regulations that fully account for and promote the lifecycle benefits of ultra-low GHG gaseous fuel blends.

Summary and Recommendations

The widespread adoption of RNG fueling for NGVs has only increased the synergies between NGVs and FCVs. As such, the agencies should continue to recognize the linkage between these fuels as part of an advanced gaseous fuel pathway for game-changing, long-term emission reductions.

- The mutually-reinforcing ability of both NGVs and FCVs to deliver "game-changing" emission reductions should be used as a further rationale for returning to the use of the "0.15 divisor" for calculating NGV emissions, as discussed in the above section on RNG.

Emissions Solution for Mid-Life Vehicles

Issues Addressed:
- *The impact of the standards on consumer behavior, including but not limited to consumer purchasing behavior and consumer automobile usage behavior.*

Sec. 202(a) of the Clean Air Act requires the agencies to regulate vehicle emissions throughout their useful life, but the current light-duty program only provides incentives for low-emission technologies deployed in *new* vehicles. This is becoming an issue because the past decade has seen a slow, steady increase in the average life of vehicles on our roads, and particularly for light trucks. According to data from the Bureau of Transportation Statistics, the average life of cars on US roads has increased from 9.5 years in 2005 to 11.5 years in 2015[42] - surpassing the 10 year vehicle life currently considered by the agencies.

This trend will likely continue and accelerate if regulations drive up the cost of new vehicles by thousands of dollars, as the agencies themselves have estimated. This will encourage drivers to hold onto their older, less fuel-efficient, and more polluting cars and light trucks for longer and longer, undermining the benefits of the regulations.

[42] *Transportation Energy Databook 2016*, OAK RIDGE NATIONAL LABORATORY, http://cta.ornl.gov/data/index.shtml

VNG

With conventional gasoline cars and trucks, it is essentially impossible to improve the fuel economy and emissions of a given vehicle after it rolls off the assembly line. However, retrofitting existing vehicles to fuel on natural gas has long been a major part of the NGV industry, particularly in states like Oklahoma[43] and Utah[44] that have actively sought to promote the retrofit market. The robust retrofit ecosystem in place for NGVs is fully capable of addressing this market, and the updated certification requirements for remarketed and used vehicles established by EPA in 2012[45] could make this a very cost-effective way to deliver real emissions and petroleum consumption benefits.

While expanding the rules to include emission and petroleum reductions from vehicles that have already been sold is novel, the environmental and energy security benefits that would result are just as meaningful as those stemming from sales of cleaner, more efficient new vehicles.

One way to incentivize retrofits of existing vehicles would be to allow EPA-certified conversion companies to "opt in" to the regulation for the purpose of generating credits for every vehicle they retrofit to operate on natural gas. These credits would be pro-rated based on the vehicle's projected remaining useful life - for instance, a vehicle that is five years old (halfway through the current 10 year/100,000 mile definition of useful life used by the agencies) would receive credits equal to 50% of the emissions benefits of a new NGV, including the "0.15 divisor" and the full-size pickup bonuses proposed in previous sections. The conversion company could then sell the credits to automakers looking to reduce their compliance costs in a given vehicle category.

Incentives for the development of the aftermarket upfit and retrofit ecosystem could also be incorporated into regulations for new vehicles, by including credits for CNG "prep packages" in the off-cycle credit program. For instance, the previously-mentioned 2016 Ford F-150 pickup has a CNG "prep package" including hardened valves, valve seats, pistons and piston rings, which significantly reduces the future cost of upfitting/retrofitting the vehicle for CNG operation.[46] Since this feature increases the likelihood that vehicles will be converted to a low-emission, non-petroleum fuel, it should be included on the off-cycle credit menu.

We encourage the agencies to consider these and other creative solutions to incorporate retrofits and aftermarket upfits into the rules. Doing so would help to counter the environmental and petroleum consumption impacts of increasing vehicle life, encourage closer collaboration between automakers and conversion companies, and improve the rules' cost-effectiveness.

---

[43] Jay F. Marks, *CNG vehicle conversion business is booming for Oklahoma company*, THE OKLAHOMAN (Mar. 16, 2012), http://newsok.com/article/3658028.

[44] Clifford Krauss, *Surge in Natural Gas Has Utah Driving Cheaply*, N.Y. TIMES (Aug. 29, 2008), http://www.nytimes.com/2008/08/30/business/30gascars.html.

[45] *Certification and Compliance for Vehicles and Engines*, ENVIRONMENTAL PROTECTION AGENCY, https://www3.epa.gov/otaq/consumer/fuels/altfuels/altfuels.htm.

[46] *First Compressed Natural Gas and Propane-Capable 2016 Ford F-150 Rolls Off The Line At Kansas City*, FORD MOTOR CO. (Dec. 9, 2015), https://media.ford.com/content/fordmedia/fna/us/en/news/2015/12/09/first-compressed-natural-gas-and-propane-capable-2016-ford-f-150.html.

VNG

Summary and Recommendations

NGVs offer a unique, proven pathway to reducing the emissions and petroleum consumption of the existing vehicle fleet, which is likely to be a growing issue as vehicle lifespans continue to be extended. Accordingly, the existing ecosystem of NGV conversion companies (as exemplified by states like Oklahoma and Utah) as well as OEMs should benefit from regulatory incentives for serving this important potential market.

- Allow EPA-certified converters to "opt in" to the program and generate credits for CNG retrofits and upfits that can subsequently be sold to automakers.

- Provide emission credits for CNG "prep packages" that reduce the costs of subsequent conversion to natural gas, as part of the off-cycle credit technologies listed at 40 C.F.R. § 86.1869–12, *CO_2 credits for off-cycle CO_2-reducing technologies.*

Addressing the Threat of Petroleum Dependence

Issues Addressed:
- *The cost on the producers or purchasers of new motor vehicles or new motor vehicle engines*
- *The impact of the standards on consumer behavior, including but not limited to consumer purchasing behavior and consumer automobile usage behavior (e.g. impacts on rebound, fleet turnover, consumer welfare effects, etc.)*
- *The impact of the standards on the automobile industry*

While EPA's emission regulations under the Clean Air Act serve an important purpose, they currently overshadow the original reason that Congress created the CAFE program in 1975: to reduce America's dependence on the petroleum fuels. The Energy Policy and Conservation Act was a direct response by lawmakers to the catastrophic economic and geopolitical effects of the 1973 oil crisis, but this purpose should also be fresh in the minds of today's policymakers and regulators. Like virtually every other economic recession, the oil price spike of 2007 is widely regarded as triggering the Great Recession in 2008, which devastated the global economy and cost over a hundred thousand jobs in the automotive sector as Chrysler and GM went into bankruptcy.[47]

Much more recently, Hurricane Harvey's devastation seriously disrupted the nation's gasoline fuel supplies[48] – a reminder (along with Superstorm Sandy in 2012[49]) that our dependency on one fuel source poses inherent risks beyond political or economic events.

[47] James Hamilton, "Oil Prices and the Economic Downturn." Testimony Prepared for the Joint Economic Committee of the U.S. Congress (May 20, 2009), https://www.jec.senate.gov/public/_cache/files/a6fca8ca-4c4f-4006-bca5-67e972dc19e2/hamilton-testimony.pdf

[48] Gaurav Sharma, *Hurricane Harvey Has Morphed Into A Major U.S. Gasoline Supply Disruption Event*, FORBES (August 28, 2017), https://www.forbes.com/sites/gauravsharma/2017/08/28/hurricane-harvey-has-morphed-into-a-major-u-s-gasoline-supply-disruption-event/#319555b72872

VNG

The U.S. shale oil boom of recent years, while welcome, does not change this near-total dependence on petroleum fuels, nor the associated vulnerabilities. Despite increased production and exports, we still import nearly half of the oil consumed in this country.[50] Moreover, regardless of the degree of oil imports, the TAR acknowledges that "the price impacts of an oil disruption anywhere will continue to be transmitted to U.S. markets"[51] because oil is a global commodity. And Middle East and North African countries – which have triggered 8 of the 10 oil price shocks in history, and face significant threats from the rise of ISIS and Saudi/Iranian tensions – still account for 30% of global production, a share that the TAR expects to rise.[52]

Despite this ever-present danger hanging over our country, and despite the original intent of the CAFE rules, the TAR chapter on energy security acknowledges that the present regulations will barely make a dent in this dependence. In 2025, the TAR projects that U.S. oil imports will be reduced by 169,000 barrels a day thanks to the rules – less than 6% of imports, which will continue to *rise*, not fall. And with sales of EVs and FCVs projected to be less than 2% of the total market as late as 2030[53] - and NGV sales not projected at all – there is no expectation for alternative fuels to break oil's stranglehold on the transportation sector.

This does not have to be the case. As discussed in previous sections, NGVs are a proven, feasible solution for petroleum-free transportation, with 22 million on the road worldwide and currently-untapped potential for mass-market adoption here in America. In terms of a resource base, the shale gas revolution has created an enormous supply of domestic fossil natural gas supplies, and potential sources of RNG are found in communities and farms across the country. With this combination of a market-ready technology and an abundant, cleaner fuel supply, there is no reason for regulators to give up and resign the country to an oil-dependent future.

This is why restoring the "0.15 divisor" calculation for NGV emissions and removing other unreasonable restrictions on NGV incentives, as discussed earlier in these comments, is so important: not only is it justified based on the game-changing environmental benefits of RNG, but it also returns the joint EPA/NHTSA program to Congress's original purpose in passing the Energy Policy and Conservation Act as well as the Alternative Motor Fuels Act. By effectively removing Congress's CAFE incentives for NGVs, the current EPA rules create a conflict between environmental progress and America's energy security that does not need to exist.

Summary and Recommendations

---

[49] Kate Zernike, *Gasoline Runs Short, Adding Woes to Storm Recovery,* N.Y. TIMES (Nov 1, 2012) http://www.nytimes.com/2012/11/02/nyregion/gasoline-shortages-disrupting-recovery-from-hurricane.html?pagewanted=all

[50] *How much petroleum does the United States import and export?* ENERGY INFORMATION ADMINISTRATION (April 4, 2017). https://www.eia.gov/tools/faqs/faq.php?id=727&t=6

[51] Draft TAR, 10-22

[52] *Id.*

[53] *Id.,* 13-64

VNG

The current rules fail to meaningfully address the massive risks to America's economic prosperity and security posed by our near-total dependence on petroleum fuels in transportation. NGVs have unsurpassed potential to provide a practical solution to this dependence, but the current EPA rules effectively undercut the original Congressional intent of the CAFE program and later Congressional incentives for NGVs by eliminating the "0.15 divisor" from emission calculations.

- The potential for NGVs to provide a mass-market solution for petroleum dependence is one more reason for pursuing the comprehensive agenda of reform for NGV regulations discussed in these comments – and making these reforms effective immediately.

NGV Reform Needed Today for 2017-2021 Targets

Issues Addressed:

- *Whether the light-duty vehicle greenhouse gas standards established for model year 2021 are appropriate.*

In addition to the MTE's original focus on the 2022-2025 standards, EPA has also requested comments on whether the standards for 2021 remain appropriate. As with the 2025 targets, we believe that automakers can indeed deliver these reductions in emissions as well as petroleum consumption – but only if they are provided with appropriate incentives that recognize the contributions that NGVs make to these goals.

For all of the reasons discussed in previous sections, we believe that the challenges of meeting the targets without NGVs pose a fundamental threat to the economic viability of U.S. automakers, and thus to the hundreds of thousands of jobs that they support. And, while this challenge is likely to become dire by 2025, it is likely that it will begin impacting automakers sooner, and potentially within the 2017-2021 timeframe. Moreover, automakers will need time to ramp up their production of NGVs, and infrastructure developers like VNG will similarly need time to build fueling networks to serve the light-duty market.

Thus, EPA's desire to review the 2021 targets is an excellent opportunity to make the recommended reforms to NGV incentives sooner, rather than waiting until 2022-2025. By reforming NGV incentives effective immediately, the industry will have the regulatory certainty needed to make these long-term investments and get to work right away. Given the importance of reducing the risks of petroleum dependence to our environment and the economy, there is simply no reason to wait.

Summary and Recommendations

Because the current disparity between the treatment of NGVs and EVs is so clearly arbitrary and contrary to real-world lifecycle GHG emissions, and because automakers need this compliance flexibility and regulatory certainty in order to confidently invest in NGV production, a reform of NGV incentives should be made effective immediately – without waiting for the 2022-

VNG

2025 period. EPA's review of the 2021 targets as part of this proceeding is an opportunity to do so.

- In the process of reviewing the 2021 targets, the agencies should adopt the recommended changes to NGV incentives discussed in these comments effective immediately.

Conclusion and Summary of Recommendations

Discussions of the future of automotive emissions are too often characterized by pessimism from all sides. On one hand, environmentalists have pushed for a widespread adoption of EVs that the EPA's own projections (e.g. the TAR) show is decades away, with very limited penetration projected through 2025. On the other hand, the auto industry argues that it has no way to keep consumers from buying larger and more-polluting vehicles, nor any way to cost-effectively reduce their emissions. And those hoping for an end to the U.S.'s decades-long vulnerability to shocks from global oil markets have little hope at all.

This picture is so gloomy because NGVs are wrongly absent from the conversation. Proven, practical NGV technology and RNG fuel can benefit light truck drivers and the environment in the near term at competitive costs, and next-generation NGVs - with high-octane engines fueled by both RNG and hydrogen-enriched gas - have the potential to dramatically improve the trajectory of these vehicles for decades to come. And with America's unrivaled gas resources, NGVs also have the potential to finally break our near-total dependence on petroleum-based fuels with an affordable, cleaner, domestically-abundant fuel.

The MTE is a critical opportunity for the agencies to correct this glaring oversight. By seriously studying the promise of NGVs and by including a robust suite of incentives for their deployment comparable to those provided to EVs, the agencies can offer a compromise to please all sides. The existing targets for 2025 can be maintained as environmentalists wish; automakers can have an expanded set of compliance pathways that address their area of biggest need - light trucks and full-size pickups; and individual consumers get the vehicles they want and need while reducing petroleum dependence and environmental impacts at a reasonable cost.

In doing so, the agencies can deliver a win-win-win for America in line with the "pro-environment, pro-growth" philosophy espoused by this Administration.[54] VNG looks forward to working with the agencies as the MTE process continues to create a final rule that reduces emissions and petroleum dependence while boosting the domestic economy through maximizing our country's unsurpassed traditional fossil and renewable natural gas resources.

[54] *EPA chief: Trump's energy order sends 'pro-growth, pro-environment message'*, FOX NEWS (Mar. 29, 2017), http://www.foxnews.com/politics/2017/03/29/epa-chief-trumps-energy-order-sends-pro-growth-pro-environment-message.html.

VNG

As a final summary, we recommend the following changes to the rules:

- NGV emissions calculations should return to the "0.15" divisor effective immediately, with emissions calculated as 85% below a gasoline vehicle. This is both justified by the real-world emissions benefits of RNG and is consistent with the CAFE program. The potential for future improvements to NGV emissions from advanced engine technologies, as well as synergies with hydrogen FCVs, provides further justification for this incentive.

    - We recommend reinstating language from the MY 2011-2016 regulations under 40 C.F.R. § 600.510–12, *Calculation of average fuel economy and average carbon-related exhaust emissions*: "For natural gas-fueled model types . . . the carbon-related exhaust emissions value calculated for that model type in accordance with paragraph (b)(2) of this section multiplied by 0.15 and rounded to the nearest gram per mile, except that manufacturers complying with the fleet averaging option for N_2O and CH_4 as allowed under § 86.1818 of this chapter must perform this calculation such that N_2O and CH_4 values are not multiplied by 0.15."

- Offer a "Natural Gas Pickup" incentive similar to current hybrid-electric and "performance-based" pickup credits; however, for the natural gas pickup credit, minimum deployment thresholds should be eliminated to reflect the greater market challenges faced by NGVs - since, unlike hybrid-electrics, they use an alternative fuel.

    - This goal could be accomplished by inserting a new section (c) under 40 C.F.R. § 86.1870–12, *CO_2 credits for qualifying full-size pickup trucks*, titled "Credits for implementation of natural gas technology." The structure of these credits would be similar to those for sections (a) and (b), but with reduced or eliminated requirements for the "required minimum percent of full size pickup trucks."

- Remove the utility factor requirements for a 2:1 ratio of CNG-to-gasoline range, as well as the requirement for dual-fuel NGVs to only use gasoline when the CNG tank is empty.

    - This could be achieved by deleting the requirements in 40 C.F.R. § 600.510–12, *Calculation of average fuel economy and average carbon-related exhaust emissions*, part (c)(2)(vii)(B) for fuel economy and (j)(2)(vii)(B) for emissions.

- Incorporate the potential for use of natural gas when setting targets for practical, achievable emissions improvements for light trucks and full-size pickups. Modeling used to set achievable emissions curves for pickups and light trucks should include natural

VNG

gas as a proven technology at costs based on high-volume adoption, not their current incremental costs at low production volumes.

- Allow EPA-certified converters to "opt in" to the program and generate credits for CNG retrofits and upfits that can subsequently be sold to automakers.

- Provide emission credits for CNG "prep packages" that reduce the costs of subsequent conversion to natural gas, as part of the off-cycle credit technologies listed at 40 C.F.R. § 86.1869–12, *CO_2 credits for off-cycle CO_2-reducing technologies.*

Respectfully submitted,

Robert C. Atkinson
Chief Regulatory Officer
VNG.co LLC
rcatkinson@vng.co
908-447-4201